a biopharmaceutical product cryopreservation vial located within the cryopreservation compartment, and

the biopharmaceutical product cryopreservation vial comprising a body that comprises an oblong cross-section defining proximal and distal ends of the body, and at least one nucleating structure, coupled to at least one of the proximal and distal ends of the body, the at least one nucleating structure contacting the cryopreservation fluid, and the body comprising a cryogenically stable material that is compatible with biopharmaceutical products.

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11. The biopharmaceutical product cryopreservation system of claim 10, wherein the cryopreservation fluid and the media absent the biopharmaceutical product are substantially identical in composition.

12. The biopharmaceutical product cryopreservation system of claim 10, wherein a thermal conductivity and/or a specific heat of the cryopreservation vial walls are substantially similar to those of the media or the cryopreservation fluid.

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13. A method of cryopreserving biopharmaceutical products comprising

providing a cryopreservation compartment;

locating a biopharmaceutical product cryopreservation vial within the cryopreservation compartment, wherein the biopharmaceutical product cryopreservation vial comprises a body that comprises an oblong cross-section defining proximal and distal ends of the body, and at least one nucleating structure, coupled to at least one of the proximal and distal ends of the body, and the body comprising a cryogenically stable material that is compatible with biopharmaceutical products;

locating a cryopreservation fluid in a space outside of the cryopreservation vial but within the cryopreservation compartment; and

A2 removing heat from the cryopreservation compartment, thereby freezing the cryopreservation fluid.

27. A biopharmaceutical product cryopreservation vial comprising:

a body that comprises an oblong cross-section defining proximal and distal ends of the body,

at least one nucleating structure, coupled to at least one of the proximal and distal ends of the body, and

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the body comprising a cryogenically stable material that is compatible with biopharmaceutical products.

Please add the following new claims:

Sub B1 41. (New) The biopharmaceutical product cryopreservation system of claim 1, wherein the at least one nucleating structure comprises a first nucleating structure coupled to the proximal end of the body and a second nucleating structure coupled to the distal end of the body.

42. (New) The method of claim 13, wherein the cryopreservation fluid is located so as to contact the at least one nucleating structure.

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Sub B2 43. (New) The method of claim 13, wherein the biopharmaceutical product cryopreservation vial is located within the cryopreservation compartment such that the freezing within the biopharmaceutical product cryopreservation vial moves in a direction away from the at least one nucleating structure and toward the body.

44. (New) The biopharmaceutical product cryopreservation vial of claim 27, wherein the at least one nucleating structure comprises a first nucleating structure coupled to

the proximal end of the body and a second nucleating structure coupled to the distal end of the body.

45. (New) A biopharmaceutical product cryopreservation system, comprising:

a cryopreservation compartment adapted to hold cryopreservation fluid; and

a biopharmaceutical product cryopreservation vial adapted to be located within the cryopreservation compartment, and

the biopharmaceutical product cryopreservation vial comprising a body that comprises an oblong cross-section defining proximal and distal ends of the body, and at least one nucleating structure, coupled to at least one of the proximal and distal ends of the body, the at least one nucleating structure adapted to contact cryopreservation fluid when present within the cryopreservation compartment, and the body comprising a cryogenically stable material that is compatible with biopharmaceutical products.

46. (New) The biopharmaceutical product cryopreservation system of claim 45, wherein the cryopreservation compartment comprises one or more cooling surfaces.

47. (New) The biopharmaceutical product cryopreservation system of claim 46, wherein the one or more cooling surfaces comprise one or more internal surfaces of the cryopreservation compartment.

48. (New) The biopharmaceutical product cryopreservation system of claim 46, wherein the one or more cooling surfaces comprise two or more cooling surfaces spaced apart from one another.

49. (New) The biopharmaceutical product cryopreservation system of claim 48, wherein a distance between two or more cooling surfaces spaced apart from one another ranges from about 0.1 mm to about 1500 mm.